

### **3.18 Public Health and Safety, Utilities and Public Services, Solid Waste, Power**

This section presents the Public Health and Safety, Utilities and Public Services, Solid Waste, and Power analyses. Public health and safety includes potential impacts associated with construction-related health and safety risks, including fires and emergencies, and disease vectors. Another safety issue, the potential for changes in flooding downstream of the reservoirs, is discussed in Section 3.6, Flood Hydrology. Utilities and public services include potential impacts on electricity, natural gas, water supplies, stormwater management, wastewater, solid waste, telecommunications, public roads, police, and fire services. The power analysis examines the potential impacts on existing power facilities and the resulting loss of power production. The economic impacts from changes in PacifiCorp customer rates as a result of dam removal costs are discussed in Section 3.15, Socioeconomics.

#### **3.18.1 Area of Analysis**

The area of analysis differs based upon the specific resource being analyzed. The primary area of analysis includes the Klamath River from Keno Dam through the J.C. Boyle Reservoir to Iron Gate Dam, the Klamath River downstream of Iron Gate Dam, counties and communities in the area, and areas in the Upper Klamath Basin that could be affected by implementation of the Klamath Basin Restoration Agreement (KBRA) (see Figure 3.18-1).

##### **3.18.1.1 Public Health and Safety**

The area of analysis includes the area in the immediate vicinity of the Klamath River, from Keno Dam through J.C. Boyle Dam to Iron Gate Dam, including the Four Facilities as well as areas identified as construction/demolition areas and staging areas for the alternatives. These areas will have construction and physical changes to the environment that may result in public health and safety concerns.

##### **3.18.1.2 Utilities and Public Services**

The area of analysis for utilities and public services includes the counties and communities where temporary workers would live and use community resources and services, and the areas where substantial construction activities would occur, as shown in Table 3.18-1.

##### **3.18.1.3 Solid Waste**

The area of analysis for solid waste includes the landfills and waste management facilities in Siskiyou and Klamath Counties.

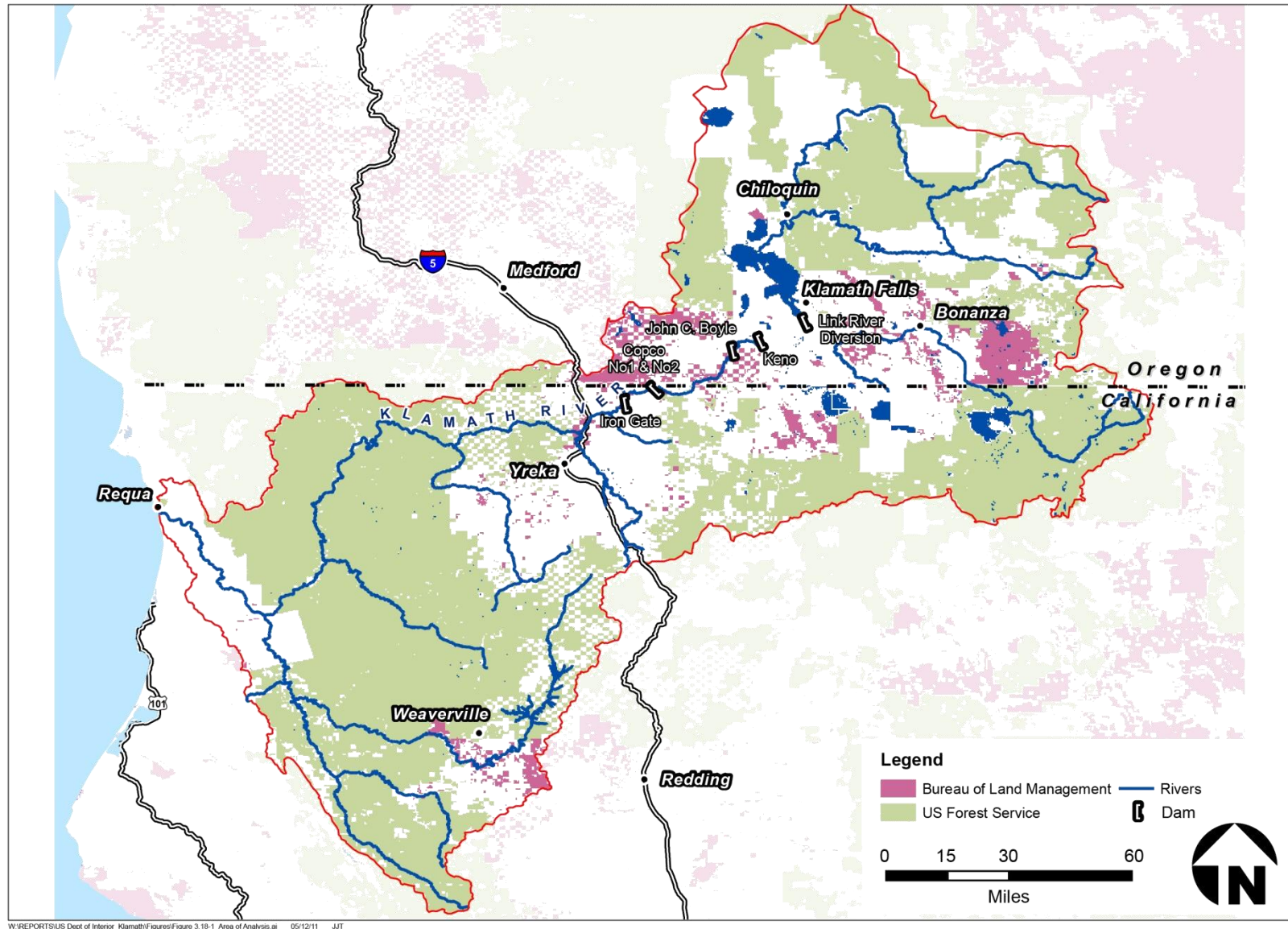


Figure 3.18-1. Area of Analysis

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**Table 3.18-1. Area of Analysis for Utilities and Public Services**

County	Community	State
Siskiyou	Yreka	CA
	Hornbrook	CA
	Copco Village	CA
	Beswick	CA
Klamath	Merill	OR
	Klamath Falls	OR
	Chiloquin	OR
	Keno	OR

#### **3.18.1.4 Power**

The area of analysis for power includes the Klamath Hydroelectric Project (KHP), which is owned by PacifiCorp and covers 64 river miles from the Link River Dam in Oregon to Iron Gate Dam in California.

### **3.18.2 Regulatory Framework**

Public Health and Safety, Utilities and Public Services, Solid Waste, and Power within the area of analysis are regulated by federal, state and local regulations, which are listed below.

#### **3.18.2.1 Federal Authorities and Regulations**

- Federal Energy Regulatory Commission (FERC) Founding Legislation: Title 42, chapter 84, Subchapter IV, section 7171.
- Federal Powers Act
- United States Department of Energy Organization Act.
- Resource Conservation and Recovery Act; 42 U.S.C section 6901 et seq. (1976)
- 29 CFR Part 1910: Occupational Safety and Health Standards
- 29 CFR Part 1925: Safety and Health Standards for Federal Service Contracts
- 29 CFR Part 1926: Safety and Health Regulations for Construction
- 29 CFR Part 1952: Approved State Plans for Enforcement of State Standards

#### **3.18.2.2 State Authorities and Regulations**

- California Public Utilities Commission (CPUC)
- Oregon Public Utilities Commission (Oregon PUC)
- Oregon Administrative Rules (OAR) Chapter 860
- California Code of Regulations (Title 14, Chapter 3)
- California Integrated Waste Management Act (AB 239, aka the Recycling Act)
- Oregon Department of Environmental Quality (ODEQ), OAR Chapter 340, Division 94 (OAR-340-94), and by adoption, 40 CFR Part 258 (2009).

- State Occupational Safety and Health Programs, certified under Section 18 of the Occupational Safety and Health Act of 1970 (California, certified 1973; Oregon, certified 2005)
- ODEQ, Water Quality Control. OAR Chapter 340, Division 41 (OAR-340-41) (2010).

### **3.18.2.3 Local Authorities and Regulations**

- Siskiyou County General Plan (Siskiyou County 1993).
- Siskiyou County Source Reduction and Recycling Element (CH2MHill 1997)
- The Yreka General Plan 2002–2022 (City of Yreka 2003).
- The Klamath County Comprehensive Plan (County Solid Waste Management Plan) (Klamath County 2010a).

## **3.18.3 Existing Conditions/Affected Environment**

This section describes the existing conditions/affected environment for public health and safety, utilities and public services, solid waste, and power.

### **3.18.3.1 Public Health and Safety**

An analysis of the potential affects in geologic hazards including seismology, earthquakes, and landslides in the project area is appears in Section 3.11, Geology, Soils, and Geologic Hazards. The potential for changes in flood risk downstream of the Four Facilities is described in Section 3.6, Flood Hydrology.

### **Emergency Centers**

Figure 3.18-2 shows the locations of the hospitals and fire stations within the area of analysis. No hospitals and only one fire station (Copco Lake Fire Department Station 210), at Copco 1 Reservoir, lie directly within the area of analysis. The nearest hospitals are Sky Lakes Medical Center in Klamath Falls, Oregon (roughly 20 miles east northeast of J.C. Boyle Dam), Ashland Community Hospital in Ashland, Oregon (roughly 35 miles north northwest of Iron Gate Dam), and Fairchild Medical Center in Yreka, California (roughly 18 miles southwest of Iron Gate Dam).

### **Fire Risk**

Figure 3.18-3 shows fire hazard in the project area as mapped using MODerate-resolution Imaging Spectroradiometers by the United States Department of Agriculture Forest Service (United States Department of Forest Service (USFS), Remote Sensing Applications Center, 2010). During the dry season, areas surrounding reservoirs are at risk for fires, particularly at the interface between residential development and open space. As shown in the figure, the fire threat is high to very high in the areas surrounding the Four Facilities (CalFire 2007, Oregon Department of Forestry 2006).

The Hilt Fire Company in Northern California and the Colestin Rural Fire Protection District operate as one agency out of geographic necessity. Legally, however, they are two separate entities (Colestin Rural Fire District 2005). The Hilt volunteer fire department jurisdiction includes the California side of the Colestin valley, and also

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covers part of northern Siskiyou County, down to the Hornbrook boundary (Colestin Rural Fire District 2011). The next nearest fire stations are the Keno Rural Fire Protection District Station 1 (east of Keno Dam), Yreka Fire Department (in Yreka, California), and Colestin Rural Fire Protection District (in Oregon northwest of Iron Gate Dam).

CalFire, in conjunction with county and volunteer fire departments, is also responsible for fire protection throughout the unincorporated areas of the state. There are CalFire stations in the project vicinity, including Yreka and Hornbrook. There are also a number of county fire stations throughout the project area, including Happy Camp, Seiad Valley, Etna, Fort Jones, Montague, Butte Valley, McCloud, Dunsmuir, and Mount Shasta (Fire Department Directory 2010).

Siskiyou County began developing a Multi-Jurisdictional Hazard Mitigation Plan in July of 2010. As of the writing of this document, that plan has not been adopted. A Community Wildlife Preparedness Plan was completed in 2008. The document identifies "...most County, State, and Federal roads in the region" as emergency evacuation routes (Firesafe Council of Siskiyou County 2008). The Community Wildfire Protection Plan also identifies a number of locations as evacuation sites, including the Hornbrook School and Grange.

#### **3.18.3.2 Utilities and Public Services**

The existing conditions and affected environment for utilities and public services are presented in Table 3.18-2 by county and community.

#### **3.18.3.3 Solid Waste**

County and local landfill and waste processing facilities are described below.

##### **Siskiyou County**

Solid waste in the Siskiyou County is handled by the General Services Sanitation Department (Siskiyou County 2010a). Siskiyou County has transfer stations in Mount Shasta, Happy Camp, Tulelake, Yreka, and in the Salmon River Area (Siskiyou County 2010a). Yreka Sanitary Landfill is a Class III landfill 2 miles southwest of Yreka, California. It is owned by the City and County of Siskiyou and operated by the City of Yreka. Class III landfills accept construction debris, most household garbage, greenwaste, carpet, and other types of non-hazardous waste. Hazardous wastes, such as batteries, paints, and hazardous materials must be disposed of in Class I facilities which are lined to prevent the contamination of underlying soils and groundwater.

##### **Klamath County**

The Klamath Falls Landfill is a demolition only, unlined landfill 2 miles northeast of Klamath Falls, Oregon. It is owned by the County of Klamath and operated by the Klamath County Community Development-Solid Waste Division.

#### **Summary of Local Landfills and Transfer Facilities**

Several landfills in the project area could receive solid waste from deconstruction activities. Table 3.18-3 summarizes regional landfills and recycling centers closest to the Iron Gate Dam.



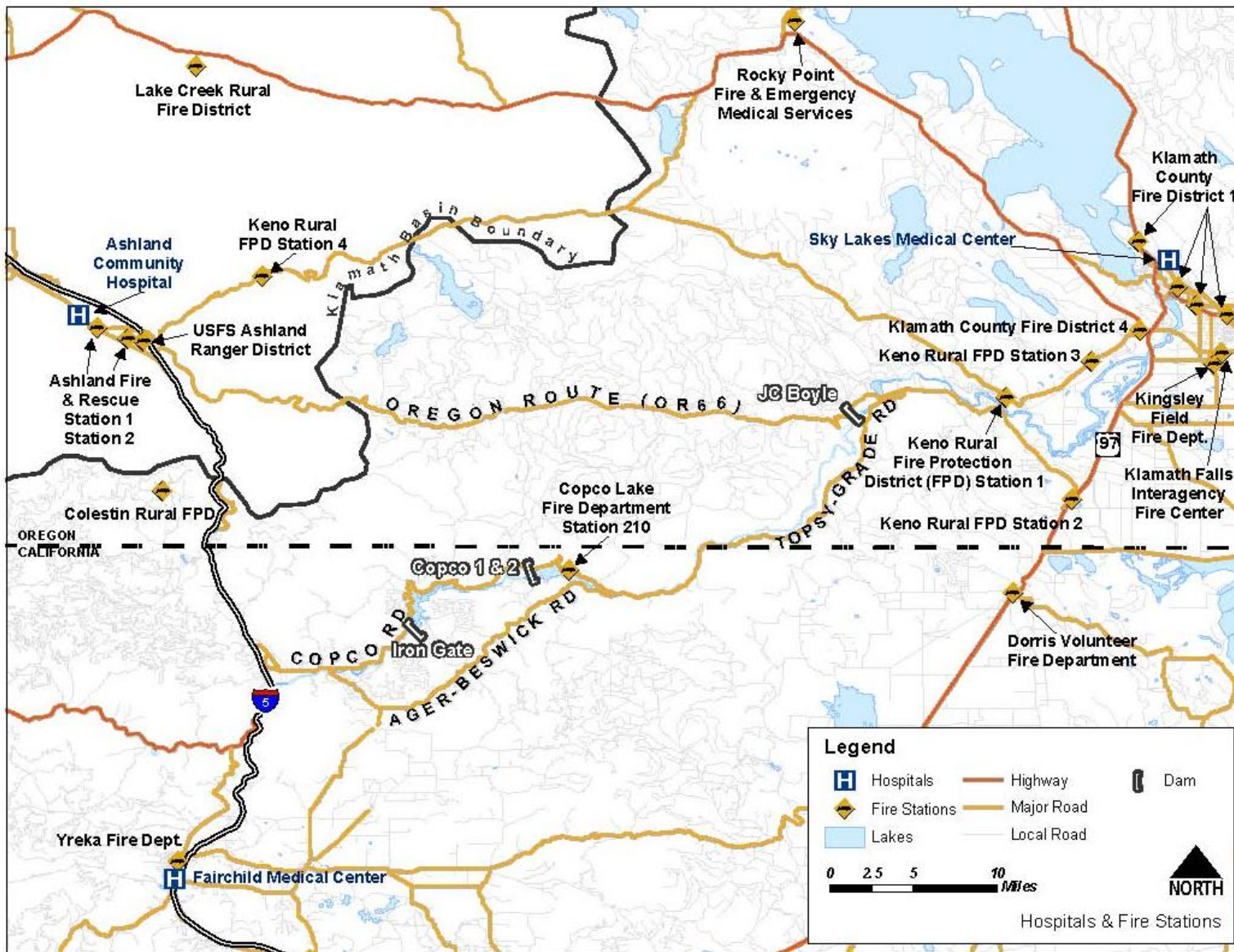


Figure 3.18-2. Hospitals and Fire Stations near the Project Area

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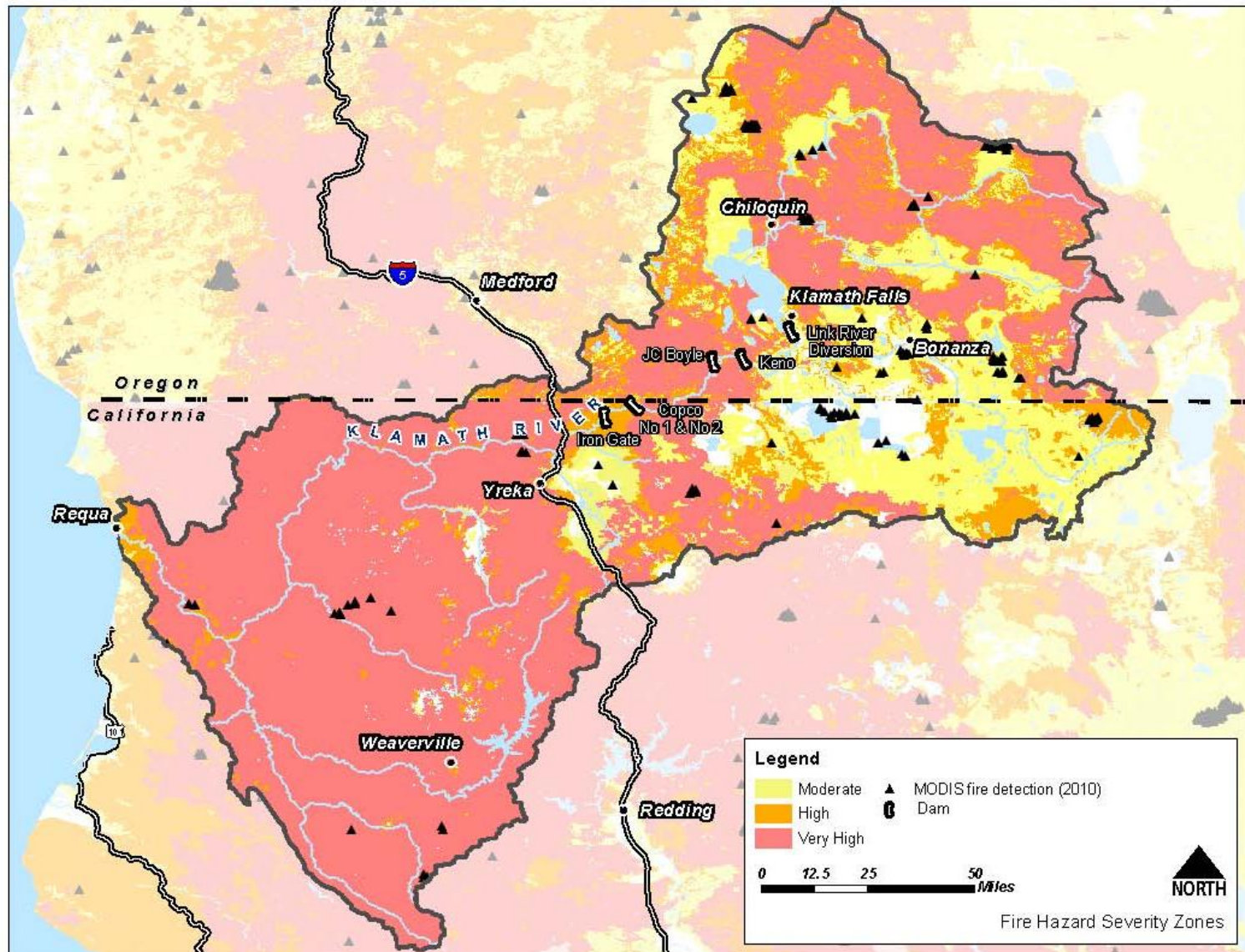


Figure 3.18-3. Fire Hazard in the Area of Analysis

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**Table 3.18-2. Utilities and Public Services in the Study Area**

County	Electricity	Natural Gas	Water Service	Wastewater	Stormwater	Telecommunications	Police and Fire	Schools
<b>Siskiyou County</b>	Siskiyou County is served primarily by PacifiCorp. <sup>1</sup> Electricity supplies are mainly hydro-generated, with the closest PacifiCorp hydroelectric facilities in Siskiyou and Klamath Counties on the Klamath River.	Natural gas is supplied by PG&E (California Energy Commission (CEC) 2010b).	Municipal and Industrial water supply is not provided by the county; it is provided by cities and towns in the county (Siskiyou County DPW 2010).	The county does not provide wastewater treatment. Residences in the unincorporated county are served by on-site septic systems (Dean 2010). Cities, as described below, are responsible for wastewater treatment.	Stormwater management is done by the individual municipalities within the county.	Telephone services are provided by AT&T and Pac-West (Wise 2010).	Police services are provided by the Siskiyou County Sheriff's Department (Siskiyou County 2010b). Fire protection is provided by 12 fire protection districts: Happy Camp District, Copco Lake District, Hornbrook District, South Yreka District, Scott Valley District, Callahan District, Montague District, Gazelle District, Butte Valley District, Tulelake District, Mount Shasta District, and the Dunsmuir District (Siskiyou County 1975).	The Siskiyou County Office of Education oversees the school districts and educational programs (Siskiyou County Office of Education, 2010). The county has charter schools, elementary schools, high schools, and a unified school district (Siskiyou County Office of Education 2010).
<b>City of Yreka</b>	PacifiCorp provides electrical power (CEC 2010a). <sup>1</sup>	Natural gas is provided by PG&E (CEC 2010b).	Yreka currently receives its municipal water supply from Fall Creek (City of Yreka 2010a). Yreka's main transmission line runs under Iron Gate Reservoir upon the lakebed (City of Yreka 2010b). Yreka's water supply is piped from the Fall Creek Pumping Station near Copco 1 Reservoir through a 24-inch pipe for 23 miles to Yreka (City of Yreka 2003). Current water use in the winter is approximately 1 mgd; however, in the summer this use increases up to approximately 6 mgd (City of Yreka 2003). Yreka obtains its water based on a state water right allowing withdrawal of up to 15 cfs (9.7 mgd) (City of Yreka 2010a).	The city has one wastewater treatment plant that treats and disposes of both domestic and industrial sewage generated within the city's boundaries (City of Yreka 2010c). The facility is designed to accommodate up to 1.3 mgd of average dry weather flow. Yreka's general plan reported that average dry weather flow in 2003 was between 0.7 and 0.9 mgd (City of Yreka 2003).	Stormwater management is the responsibility of Yreka's Public Works Department.	Telephone service is provided by AT&T and Pac-West.	Police services are provided by the City of Yreka Police Department and Fire services are provided by the Yreka Fire Volunteer Department (City of Yreka 2010d; City of Yreka 2010e).	Yreka is served by the Yreka Union Elementary School District and the Yreka Union High School District (Siskiyou County Office of Education, 2010).
<b>Hornbrook</b>	Electricity is provided by PacifiCorp (Wise 2010).	Natural gas in the county is supplied by PG&E (CEC 2010b).	Water supply in Hornbrook comes from private groundwater wells (Wise 2010).	Residents use on-site septic systems for wastewater treatment (Dean 2010).	Stormwater runoff is conveyed through natural drainages (Dean 2010).	Telephone services are provided by AT&T (Dean 2010).	The Siskiyou County Sheriff provides police protection services to the community of Hornbrook (Wise 2010).	Yreka Union School District serves the community of Hornbrook (Wise 2010).
<b>Copco Village</b>	Electricity is provided by PacifiCorp (Wise 2010).	Natural gas in the county is supplied by PG&E (CEC 2010b).	Water supply in Copco Village comes from private groundwater wells (Wise 2010).	Wastewater service is provided by on-site septic systems (Dean 2010).	Stormwater runoff is conveyed through natural drainages (Dean 2010).	Telephone services are provided by AT&T (Dean 2010).	The Siskiyou County Sheriff provides police protection services to the community of Copco Village (Wise 2010).	Yreka Union School District serves the community of Copco Village (Wise 2010).
<b>Beswick</b>	Electricity is provided by PacifiCorp (Wise 2010).	Natural gas in the county is supplied by PG&E (CEC 2010b).	Water supply in Beswick comes from private groundwater wells (Wise 2010).	Wastewater is treated in on-site septic systems (Dean 2010).	Stormwater runoff is conveyed in natural drainages (Dean 2010).	Telephone services are provided by AT&T and Pac-West (Wise 2010).	The Siskiyou County Sheriff provides police protection services to the community of Beswick (Wise 2010).	Yreka Union School District serves the community of Beswick (Wise 2010).
<b>Klamath County</b>	PacifiCorp provides electric power to the county (Dobry 2010).	Avista Utilities provides natural gas services to the county (Dobry 2010).	Water supplies in the unincorporated county come from private groundwater wells as well as numerous private water companies that serve some community subdivisions (Dobry 2010). Additionally, some water is provided by the City of Klamath Falls (Dobry 2010).	Wastewater in the county is provided by the Klamath County Community Development On-Site Sanitation Division (Klamath County 2010b).	Stormwater flows through roadside ditches and natural drainages (Gallagher 2010).	Telephone service is provided by USWest (Gallagher 2010).	The Klamath County Sheriff Department provides police protection in the county (Klamath County 2010c). Klamath County is served by 17 fire districts: Bly Fire District, Bonanza Fire District, Chemult Fire District, Chiloquin Fire District, Crescent Fire District, Central Cascades Fire District, Harriman Fire District, Keno Fire District, Klamath County Fire Districts numbers 1 through 5, La Pine Fire District, Malin Fire District, Merrill Fire District, and North Klamath Fire District (Klamath County 2010c).	The Klamath County School District includes 20 schools, including elementary, junior high, and senior high schools (Klamath County School District 2010). Schools serving the project area include Chiloquin Elementary and Junior and Senior High Schools, Keno Elementary, and Merrill Elementary.

Table 3.18-2. Utilities and Public Services in the Study Area

County	Electricity	Natural Gas	Water Service	Wastewater	Stormwater	Telecommunications	Police and Fire	Schools
Merrill	PacifiCorp provides electric power to Merrill.	There is no natural gas supplied to Merrill (Fuller 2010).	Water supply comes from city groundwater wells on Front Street (Fuller 2010).	Wastewater is treated in Merrill's wastewater treatment plant (Fuller 2010).	Stormwater flows through natural drainages; Merrill does not maintain any constructed stormwater infrastructure (Fuller 2010).	Telephone service is provided by Century Link (Fuller 2010).	The Merrill City Police Department provides police protection services in the city (Fuller 2010). Fire protection services are provided by the Merrill Rural Fire Protection District, a primarily volunteer fire company serving the town and surrounding area.	Merrill Elementary School and Lost River High School serve the City of Merrill. Both schools are within the Klamath County School District (Fuller 2010).
Klamath Falls	PacifiCorp provides electricity to Klamath Falls.	Amerigas and Klamath Natural Gas Services provide natural gas in Klamath Falls	Klamath Falls' Water Division is responsible for providing water to more than 40,000 residents in the urban area. The division operates and maintains 13 groundwater wells, 21 pumping stations, and 22 water reservoirs with a total storage capacity of 16 million gallons (City of Klamath Falls 2010a). Klamath Falls' water supply comes from groundwater wells.	Wastewater collection and treatment service is provided by the City of Klamath Falls Wastewater Division. The division services nearly 20,000 city residents and Klamath Basin area customers (City of Klamath Falls 2010b). In addition to sewage collection and treatment, the division provides stormwater collection services, and sewage treatment for a major residential development and a major resort/residential development outside of the city limits (City of Klamath Falls 2010b). Equipment and facilities include two wastewater treatment plants, 11 wastewater pumping stations, four stormwater pumping stations, and stormwater collection lines. Wastewater treatment facilities process an average combined 4.2 mgd of wastewater from over 7,100 service connections (City of Klamath Falls 2010b). Within the Klamath Falls Urban Growth Boundary, wastewater treatment is provided by the South Suburban Sanitary District.	The City of Klamath Falls Wastewater Division manages the stormwater infrastructure in the city (City of Klamath Falls 2010b).	Phone service in the city is provided by Qwest.	The Klamath Falls Police Department is responsible for police services in the city (City of Klamath Falls 2010b). Fire protection is provided by the Klamath County Fire District No. 1. The existing fire district serves an area of 201 square miles containing approximately 52,000 residents (Klamath County Fire District 2010).	Klamath Falls City Schools oversees a mix of elementary, junior high and high school, and alternative education schools in the city (Klamath Falls City Schools 2010). There are 11 schools in the district.
Chiloquin	PacifiCorp provides electricity in Chiloquin.	Chiloquin does not use natural gas resources (Foreman 2010).	The City of Chiloquin supplies water to all city residents as well as some residents that are outside of the city but within the urban service area. Municipal water supplies come from one groundwater well (Foreman 2010).	Chiloquin has a city wastewater treatment plant (Foreman 2010).	Chiloquin maintains roadside drainages for stormwater runoff (Foreman 2010).	Telephone service is provided by Century Link (Foreman 2010).	Police and public safety in Chiloquin is provided by the Klamath County Sheriff and the Oregon State Police (City of Chiloquin 2010a). Fire service is provided by the Chiloquin-Agency Lake Rural Fire Protection District, a volunteer fire department that serves a 105-square-mile area that encompasses the city and the areas to the north and east (Klamath Fire 2005).	Three county schools in the city serve children living in Chiloquin: Chiloquin Elementary and Chiloquin Junior and Senior High Schools (City of Chiloquin 2010b; Foreman 2010).

Key:  
CEC: California Energy Commission  
DPW: Department of Public Works  
PG&E: Pacific Gas and Electric

**Table 3.18-3. Regional Landfills and Recycling Centers and Type of Waste Accepted**

Facility Name	Address	City, State/ County	Remaining Capacity (yd <sup>3</sup> )	Wastes Accepted	Distance from Iron Gate (mi)
Yreka Solid Waste Landfill	Off Oberlin Rd; 2 mi SE of Yreka	Yreka, CA/ Siskiyou	3,924,000	Construction/demolition, mixed municipal	26.7
Dry Creek Landfill	6260 Dry Creek Road	Eagle Point, OR/ Jackson	165,000,000	Construction/demolition, mixed municipal, contaminated soils	54.0
Klamath Falls Landfill	801 Old Fort Road	Klamath Falls, OR/ Klamath	435,000	Construction/demolition, contaminated soils	89.0
Yreka Med. Vol. Transfer Station	Off Oberlin Rd; 2 mi SE of Yreka	Yreka, CA/ Siskiyou	Recycling facility	Inert, metals, mixed municipal	26.7
Ecosort Material Recovery Facility	3425 E 17th Avenue	Eugene, OR/ Lane	Recycling facility	Wood, concrete, asphalt, metal, aluminum	209
Delta Sand & Gravel Demolition Landfill	999 Division Street	Eugene, OR/ Lane	1,000,000 of general excavation and 200,000 of concrete	Dirt, rock, concrete, building demolition, clearing debris and brush removal.	215
Anderson Landfill, Inc	18703 Cambridge Road	Anderson, CA/ Shasta	11,914,025	Construction/Demolition, green waste, mixed municipal, tires	134

Source: CalRecycle 2010, Loesch 2010, Oregon Department of Environmental Quality 2007, Sorensen 2010, United States Environmental Protection Agency 2006

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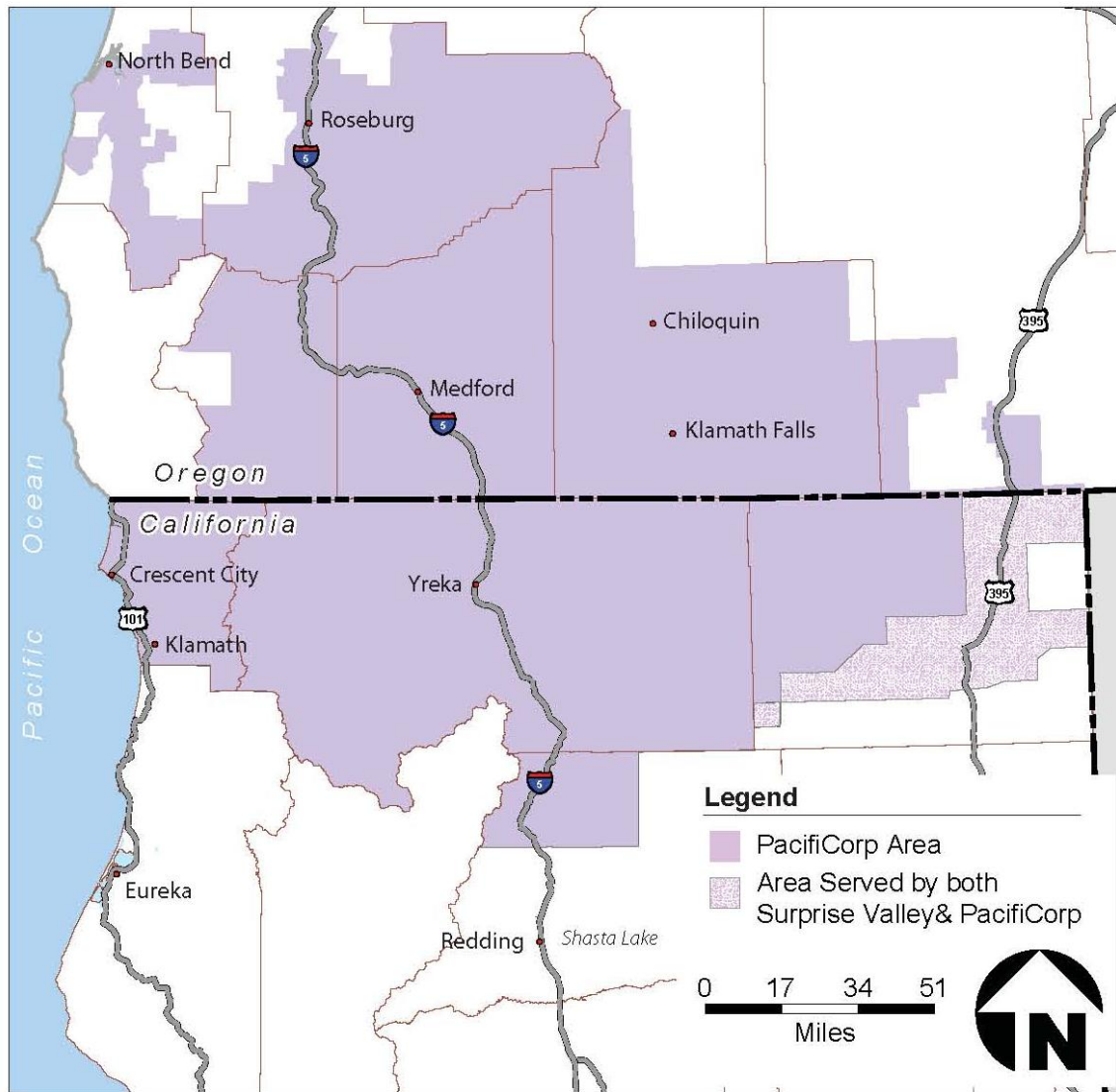
yd<sup>3</sup> = cubic yards

mi = miles

SE = southeast

#### **3.18.3.4 Power**

The KHP, operated by PacifiCorp, provides power to residential, industrial, and agricultural customers across the PacifiCorp service area (Figure 3.18-4). The KHP consists of seven hydroelectric facilities and one reregulating facility with an installed capacity of approximately 169 megawatts (MW) and a total average annual electric output of 716,800 megawatts hours (MWh), as shown in Table 3.18-4 (FERC 2007). Six of the generating facilities are on the Klamath River, with the seventh on Fall Creek, a tributary to the Klamath River that enters at River Mile 196.3, between Iron Gate and Copco 2 Reservoirs. Keno Dam is a reregulating facility with no generating capacity. The KHP covers 64 river miles, from the Link River Dam in Oregon to Iron Gate Dam in California (California Energy Commission [CEC] 2003).



**Figure 3.18-4. PacifiCorp Service Area**

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**Table 3.18-4. Klamath Hydroelectric Project Facilities**

Facility Name	Generating Facility	Total Authorized Generating Capacity (MW)	Average Annual Generation (MWh)	Location	River Mile (RM)
Link River Dam	East Side Powerhouse	3.19 MW	15,400	Klamath Falls, OR	RM 254
	West Side Powerhouse	0.6 MW	3,400	Klamath Falls, OR	RM 254
Keno Dam and Impoundment	None (Re-regulating facility with no power generation capabilities)	None	None	20 miles downstream of East Side and West Side Powerhouses	RM 233
J.C. Boyle Dam and Reservoir	J.C. Boyle Powerhouse	97.98 MW	329,000	OR	RM 224.7 (Dam) RM 220.4 (Powerhouse)
Copco 1 Reservoir	Copco 1 Powerhouse	20.0 MW	106,000	CA	RM 198.6
Copco 2 Reservoir	Copco 2 Powerhouse	27.0 MW	135,000	CA	RM 196.8
Iron Gate Dam and Reservoir	Iron Gate Dam Powerhouse	18.0 MW	116,000	CA	RM 190
Fall Creek (On Klamath River tributary that flows into upper Iron Gate Dam Reservoir)	Fall Creek Powerhouse	2.2 MW	12,000	CA	196.3
<b>Total:</b>		<b>168.97</b>	<b>716,800</b>		

Key:  
MW = megawatts  
Source: FERC 2007

PacifiCorp has, in its 2004 relicensing submission to FERC, described plans to decommission the East Side and West Side Powerhouses. These two facilities are located at the Link River Dam, and as shown in Table 3.18-4, have a combined nameplate capacity of less than 4 MW. The cost to install screening on these facilities to protect the federally listed suckers in Upper Klamath Lake would be prohibitive given the small amount of power they produce (FERC 2007). The Proposed Action would remove four of the eight facilities (J.C. Boyle, Copco 1, Copco 2, and Iron Gate Dams). These Four Facilities under consideration for removal have a nameplate generation capacity of approximately 163 MW of electricity, and produce an average of 686,000 MWh annually (see Table 3.18-4). J.C. Boyle is able to produce peaking power during periods of high demand (FERC 2007); but, due to a number of factors, such as limited storage capacity in the reservoirs and flow restrictions imposed by the Biological Opinions for coho salmon and the sucker species, the rest of the project is operated more as a “run of the river” facility (CEC 2006).

While an excess of generation capacity exists in the Northwest sub region, transmission constraints prevent much of the power generated in the Northwest Power Pool from being used south of the project area in areas that are constrained by electrical supply (North American Electric Reliability Corporation 2010). PacifiCorp’s 2008 Integrated Resource



Plan provides an overview of the company's available generation and transmission capacity. According to the Integrated Resource Plan, which assumes relicensing of all of the company's hydroelectric facilities, PacifiCorp will be "summer peak resource deficit" in 2011 (PacifiCorp 2008). This deficit was to be met in the short term with additional renewable, demand-side programs, market purchases from other generating companies, and improvements to the efficiency of coal fired plants (PacifiCorp 2008). PacifiCorp outlined a series of actions in the plan to meet this deficit, including the addition of 144 MW of wind resources in 2009 through company owned resources and purchases, and the addition of 269 MW of wind resources in 2010 with company owned resources and 119 MW of power purchases (PacifiCorp 2008). These improvements and purchases will allow PacifiCorp to meet the expected load across their service area.

### **3.18.4 Environmental Consequences**

#### **3.18.4.1 Environmental Effects Determination Methods**

##### **Public Health and Safety**

The impact analysis for public health and safety focuses on proposed deconstruction activities surrounding the Four Facilities and associated reservoirs and how these would affect the health and safety of the general public and construction workers. Other sections in the Klamath Facilities Removal Environmental Impact Statement/Environmental Impact Report (EIS/EIR) describe several public health and safety impacts. Section 3.11, Geology, Soils, and Geologic Hazards discusses Geologic stability of nearby soils (i.e., slumping and landslides) and geologic hazards such as seismology and volcanology. Section 3.3, Aquatic Resources, and Section 3.2, Water Quality, discuss water quality impacts. Changes in hydrology and flooding are discussed in Section 3.6, Flood Hydrology, and Section 3.8, Water Supply/Water Rights. Section 3.22, Traffic and Transportation, discusses the impact to area roads and bridges, and safety issues associated with the Proposed Action and vehicular traffic. Impacts on the recreational areas, with the exception of potential impacts to visitors using the areas, are discussed in Section 3.20, Recreation. Impacts to visitors as a result of the proposed deconstruction are discussed in this section.

##### **Utilities and Public Services**

The Lead Agencies determined the impacts on utilities by examining utilities and services in the project area and how they would be affected by demolition activities. The discussion of utilities also covers the demands for electricity and natural gas that would result from deconstruction and construction activities. Removal of hydropower facilities and resulting changes in hydropower production are addressed below in the hydropower section. The Proposed Action and alternatives do not have the potential to affect schools in terms of additional students or longer bus routes. However, if the Proposed Action is carried out, there could be reduced tax revenue available to fund local schools. Section 3.15, Socioeconomics, discusses impacts to local tax revenues. The Proposed Action would not require new or expanded stormwater or wastewater facilities; therefore, these services and utilities are not discussed further. Geothermal resources have been identified in the area, but no plans exist to develop these resources as part of the Proposed Action.

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Any future development of geothermal resources would require focused environmental compliance and review, and development of these resources is not discussed further.

#### **Solid Waste**

The Lead Agencies determined the solid waste impacts by assessing the ability of local facilities to accept non-hazardous materials that could not be disposed of at the dam sites. Deconstruction of the dams is anticipated to generate solid waste comprising earth, concrete, metal, wood planks, and asphalt. It is assumed that most of this material that cannot be safely disposed of on-site would be considered inert material and could be disposed of in Class III landfills (See Table 3.18-3, Regional Landfills and Recycling Centers and Type of Waste Accepted). In addition, a large portion of deconstruction and construction debris, such as the asphalt, concrete, rebar, metal from the powerhouses and transmission infrastructure, and reclaimed lumber, would be diverted from landfills through reuse and recycling. No solid waste would be generated after deconstruction is complete.

#### **Power**

The analysis for power focuses on changes to existing hydropower facilities and the potential need for replacement power production after the Proposed Action and alternatives have been implemented.

#### ***3.18.4.2 Significance Criteria***

##### **Public Health and Safety**

For the purposes of this EIS/EIR, impacts on public health and safety would be significant if an alternative would do the following:

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures to a significant risk of loss, injury or death involving construction safety hazards, emergency routes, or wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

##### **Utilities and Public Services**

For the purposes of this EIS/EIR, impacts on utilities and public services would be significant if the alternative would do the following:

- Result in substantial adverse physical impacts that create the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire protection; police protection; schools; parks; other public facilities.
- Result in increased demand for utilities that could exceed the capacity and outputs of existing facilities/infrastructure, and require new or expanded facilities/infrastructure that could result in significant environmental impacts.

- Be served by a landfill with insufficient permitted capacity to accommodate solid waste disposal needs.
- Not comply with federal, state, and/or local statutes and regulations related to solid waste.

#### **Power**

For the purposes of this EIS/EIR, impacts on power would be significant if an alternative would do the following:

- Require or result in the construction of new facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Result in insufficient power supplies available to serve existing customers.

#### **3.18.4.3 Effects Determinations**

##### **Alternative 1: No Action/No Project**

Under the No Action/No Project Alternative, no deconstruction or construction would occur at the Four Facilities. Thus, no change to risk of public safety as a result of construction related safety risks, emergency routes, or wildland fires would occur under the No Action/No Project Alternative. Because no deconstruction or construction activities would occur under the No Action/No Project Alternative, no changes in the provision of public services and utilities would result from the No Action/No Project Alternative.

*Under the No Action/No Project Alternative, hydropower generation would continue subject to the conditions of the United States Bureau of Reclamation (Reclamation) Biological Opinions, which could have the potential to decrease hydropower production.* Hydropower generation is controlled by the allowed ramping rates in the J.C. Boyle Bypass Reach and the minimum flow requirements downstream of Iron Gate Dam allowed by the annual license (see Chapter 2 for a description of these requirements). Until a new license is issued, operations would continue under the annual license terms and the terms of the Biological Opinions issued by Reclamation with consultation from National Oceanic and Atmospheric Administration Fisheries and the U.S. Fish and Wildlife Service (Reclamation 2010). The flows downstream of Iron Gate Dam are governed by the 2010 Biological Opinion, which supersedes the terms of the annual license. However, the flows and ramp rates downstream of J.C. Boyle Dam are still governed by the 2007 environmental measures. Peaking generation would continue, but the flow limitations would not allow “no load to full two-unit peaking events” which is able to increase flows by up to 3,000 cfs (PacifiCorp 2006). Two-unit operations would only be done when inflows to J.C. Boyle are high enough to run both units, or run one unit in continuous operation and use the second unit for peaking generation. PacifiCorp estimates that power generation would be reduced by 40 percent over the long term at J.C. Boyle, and by up to 100% during summer time peak demand periods due to the daily flow change limits discussed above. However, PacifiCorp maintains adequate power supplies to provide service to its customers in the Project Area. **There would be no**

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**change from existing conditions for the provision of hydropower from the No Action/ No Project Alternative.**

**Ongoing Management Activities**

*Construction activities related to the ongoing restoration and management activities could impact public health and safety.* Under the No Action/No Project Alternative, there would be some limited construction activities associated with ongoing habitat restoration projects. Construction associated with these projects would be short-term and an applicable public health and safety plan would be developed for each project to ensure construction workers and the public were not adversely affected during construction and operation. **There would be no impact to public health and safety from these ongoing management activities.**

**Alternative 2: Full Facilities Removal of Four Dams (the Proposed Action)**

The Proposed Action involves removal of all features, with the exception of buried features, at the Four Facilities.

*Construction activities could result in public health and safety risks.* Earthwork and blasting have the potential to cause injuries from flying rock and other debris. Large construction vehicles and other equipment used for deconstruction and activities (referred to in this document as construction equipment) operating in and around the project area would pose a safety hazard to the general public. Work within waterways would pose hazards to boaters, if boating were allowed in the construction zone. **Construction impacts on public health and safety would be significant, but Mitigation Measure PHS-1 would reduce this impact to a less-than-significant level.**

*Construction activities could increase public hazards by placing construction equipment in waterways, roadways, and other areas accessible by residents, recreational visitors, and potential spectators of the deconstruction activities.* The dam demolition and construction areas (referred to in this sub-section as construction areas) would be closed off to the public while they are under construction to reduce hazards; however, the use of the roadways for truck hauling of materials could interfere with existing emergency evacuation plans and increase response times for emergency vehicles. Due to the rural nature and the low concentration of roads in the area, most roads are used as evacuation routes in the event of fire or other emergencies. Figure 3.18-2 shows the locations of the hospitals and fire stations within the area of analysis. Figure 3.23-1 in Section 3.23, Noise and Vibration shows potential haul routes that would be used for transporting materials as part of the Proposed Action. Although the dams are not directly on major roadways (Route 66, Copco Road, and Interstate 5), these roads would likely need to be accessed to transport materials and equipment to and from the dam sites and to landfills or nearby borrow areas for disposal. **The placement of construction equipment in areas potentially accessible by residents and recreational visitors would be a significant impact. The use of the roadways for truck hauling of materials could also be a significant impact on public safety. Implementation of Mitigation Measures PHS-1 and PHS-2 would reduce these impacts to a less-than-significant level.**

*Construction and demolition activities could increase the risk of wildfires.* As shown in Figure 3.18-3, the fire threat in the areas surrounding the Four Facilities is categorized as high to very high (CalFire 2007). During the dry season, the areas surrounding J.C. Boyle, Copco 1, Copco 2, and Iron Gate Reservoirs are at risk for wildfires, particularly at the interface between residential development and open space. Deconstruction activities, particularly those that may result in accidental spills of flammable liquids or use of equipment that generates heat, such as welding, grinding, torch-cutting, gas and diesel generators, and other construction activities could result in open sparks or flame in vegetated open space could further aggravate the risk of fire. **The risk of fire would be a significant impact to public health and safety, but implementation of Mitigation Measure PHS-2 would reduce this impact to a less-than-significant level.**

*Removal of the dams could eliminate a water source for wildfire services and could increase response times.* Currently, helicopter fire crews use water from the reservoirs and the Klamath River to fight wildfires in the project vicinity (Dodds 2010). Under the Proposed Action, removal of the J.C. Boyle, Copco 1, Copco 2, and Iron Gate Reservoirs would remove a potential water source for fire fighting. The Klamath River would remain after dam removal, and surface water modeling (described in Section 3.6, Flood Hydrology and Section 3.8, Water Supply/Water Rights) indicates that flows in the Klamath River downstream of the removed dams would remain unchanged. As such, helicopter fire crews could still obtain water from the Klamath River, Ewauna Lake, or Upper Klamath Lake.

The loss of the reservoirs could increase turnaround times for helicopters fighting wildfires in the project area. While it is possible for some specialized equipment to fill the water tanks from water bodies with depths as little as 18 inches, others require depths in excess of 36 inches, depending on the equipment used and the discretion of the pilot (personal communication, Henderson Aviation, January 19, 2011). Therefore, use of the Klamath River as an alternate source of water might be possible after removal of the reservoirs. However even in remote areas wildfires originate in the wildland urban interface. As discussed, the loss of the reservoirs could increase turn-around time for helicopters refilling buckets but the presence of the Klamath River and nearby reservoirs would still provide a water source for fighting fire in the wildlands surrounding the Copco area. Initial response times would not be changed by the loss of the reservoirs, and existing fire fighting assets, such as the air tankers in Klamath Falls, and the water source of Lake Ewauna, would still be in place and available. **The loss of the reservoirs would have a less than significant impact on fire suppression in the area.**

*Removal of the reservoirs could eliminate a water source for residential firefighting in and around Copco Village, potentially increasing the risk to homes from fire.* Comments received during the scoping period expressed concern that the loss of the reservoirs, particularly Copco 1 Reservoir, could endanger the existing residential areas by removing an easily accessible water source for both engines and helicopters. As discussed, the loss of the reservoirs would increase turn-around time for helicopters refilling buckets, and could eliminate easily accessible water sources for trucks, and increase turn-around times

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for trucks operating in the Copco Village. The presence of the Klamath River, existing water systems, and existing fire fighting resources ensures that assets for firefighting are present in the area. **The loss of Copco 1 Reservoir would have a less than significant impact on the water supply for residential firefighting in and around Copco Village.**

*Implementation of the Proposed Action could affect police services.* Construction activities would involve staging and stockpiling areas and equipment that would be kept on-site for the duration of construction. Security services would be provided by the construction contractor and would not increase the need for police services or the number of police personnel. **There would be no change from existing conditions in police services.**

*Implementation of the Proposed Action could require the use of electricity and natural gas supplies in the study area.* Implementation of the Proposed Action would require the use of heavy equipment to draw down and deconstruct the dams. The Dam Removal Entity (DRE) would supply power for these activities using gasoline and diesel-powered generators; power for these activities would not originate from the grid. No natural gas would be used for implementation of the Proposed Action. Thus, there would be no demand for municipal electricity or natural gas supplies during deconstruction as part of the Proposed Action, and would be no resulting increase in demand on these utilities. **There would be no change from existing conditions for electricity or natural gas supplies in the study area due to construction activities.**

*The Proposed Action deconstruction could affect the City of Yreka's municipal water supply.* As described in the environmental setting, the City of Yreka's municipal water supply pipeline passes under Iron Gate Reservoir and could be affected during construction activities. To avoid potential disruption to the city's water supply, the DRE would construct a pipe bridge to suspend the pipeline above the river during and following construction. The work on the pipeline would be planned and implanted in such a way that the pipe would be disconnected for only a short period of time, as dictated by the existing storage capacity, to avoid disrupting water service to the City. Thus, there would be no disruption in municipal water supply under the Proposed Action. **The deconstruction of Iron Gate Dam would have a less than significant impact on the City's water supply.**

*Under the Proposed Action, recreational facilities currently located on the banks of the existing reservoirs would be removed following drawdown and could affect public health and safety.* The existing recreational facilities provide camping and boating access for recreational users of the reservoirs. Once the reservoirs are drawn down, these facilities will be removed. The deconstruction could have health and safety impacts as a result of the construction equipments and work site safety issues. **The removal of the recreational facilities could impact public health and safety. The implementation of Mitigation Measures PHS-1 and PHS-2 would reduce these impacts to less-than-significant**

*Implementation of the Proposed Action could affect public services and utilities in the counties and cities in the study area.* Construction of the Proposed Action would result in short-term population increases in the area from construction workers. There could be a maximum of 100–220 workers during overlap in construction schedules for removal of all four dams. Construction workers could remain in the area for the duration of deconstruction, a period of approximately 1 year. While many of these workers might already live in the surrounding communities described under the affected environment, the need for construction workers could result in an influx of people in the area as out of area workers and their families move in for the duration of the project. Because deconstruction activities would occur temporarily, no permanent population increases would be expected. Therefore, no permanent increase in demand of public services or utilities would occur. There would not be a need for the construction of new government facilities such as water supply, wastewater treatment, or stormwater drainage.

Construction workers working at the deconstruction sites would require restroom facilities which would be provided by portable units. No other utilities would be required at the construction site. Construction workers would not deteriorate service ratios and would not require any new utilities. **Public service and utility impacts would be temporary and less than significant.**

*Implementation of the Proposed Action could result in the need for new roads.* Transportation of dam waste materials would require the development of haul roads. All new roads would be temporary and would be developed and maintained by the DRE. The DRE would remove temporary roads and return the road areas to their previous conditions after deconstruction is complete. No new public roads would be required for the Proposed Action; therefore, there would be no impact on local government services responsible for road maintenance. **The construction of new haul roads would result in less than significant impacts on local roads and government services.**

*Implementation of the Proposed Action could affect road conditions.* Construction equipment could stress road beds, causing cracking and settling, and increase the amount of maintenance and repairs that would be required to keep the roads in serviceable condition (see Section 3.22, Traffic and Transportation for more details). Indicators of road impacts, such as rutting and unevenness in the road surface, surface cracking, and road bed slumping could occur. Roadway effects would vary based on climate, the weight of the trucks and their loads, the composition of traffic, and other variables. However, the DRE would be responsible for repairing any road damage under the terms of the construction contract. **Impacts on road conditions would be less than significant given the terms of the construction contract.**

*Activities associated with the Proposed Action could generate a substantial amount of solid waste that would exceed capacity of facilities to receive the waste.* The Proposed Action would involve removal of all appurtenant features, with the exception of buried features, at the Four Facilities. Although activities associated with deconstruction would generate a substantial amount of solid waste, material recycling would reduce the amount of waste disposed in landfills in the surrounding counties. At J.C. Boyle Dam, waste

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concrete and earth materials would be used to refill the original borrow pits on the right abutment of the dam and also would be placed into the eroded scour hole through the hillside below the forebay spillway structure. For Copco 1 and Copco 2 Dams, concrete rubble would be buried on the right abutment within an on-site disposal area at Copco 1 Dam. At Iron Gate Dam, excavated embankment materials would be disposed of 1 mile upstream from the dam on the left abutment at the original borrow site. Approximately 300,000 cubic yards (yd<sup>3</sup>) of excavated embankment material would be used to fill the concrete-lined side channel spillway, chute, and flip-bucket terminal structure<sup>1</sup>. Concrete rubble from Iron Gate Dam would be buried within an on-site disposal area.

All mechanical and electrical equipment from the J.C. Boyle Dam would be hauled to the Klamath Falls Landfill, while mechanical and electrical equipment waste from Iron Gate, Copco 1, and Copco 2 Dams would be hauled to the Yreka Transfer Station. At both the Klamath Falls Landfill and the Yreka Transfer Station, mechanical and electrical equipment and scrap metal would be salvaged and recycled.

As shown in Table 3.18-5, the total amounts of inert solid waste generated under the Proposed Action would be 1,241,500 yd<sup>3</sup> of earth, 126,000 yd<sup>3</sup> of concrete, 4,500 tons of rebar, and 7,200 tons of metals. As described above, all of the waste concrete and earth are expected to be disposed of in on-site disposal areas or in the original borrow pits. A portion of the metals would be recycled, in accordance with relevant construction debris recycling regulations, at the Yreka Transfer Station, the Yreka Sanitation Landfill, and the Klamath Falls Landfill. Given that the combined remaining permitted Class III landfill capacity available at the Klamath Falls Landfill and the Yreka Solid Waste Landfill is 4.3 million yd<sup>3</sup>, the regional landfills in the surrounding counties would be capable of handling the additional waste generated by the Proposed Action. In addition, Dry Creek Landfill, also in the vicinity of the project area, has 165 million yd<sup>3</sup> of disposal capacity, and could be utilized for disposal. The disposal capacities of the existing surrounding landfills are anticipated to be sufficient for the waste generated by the Proposed Action, and the waste generated would not conflict with the solid waste policies and objectives of AB939. **The solid waste impacts associated with the Proposed Action would be less than significant.**

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<sup>1</sup> A Flip-Bucket is a type of energy dissipater that takes excess water from the reservoir and directs it downstream at a sufficient distance to prevent the spillover from creating a plunge pool or otherwise eroding the footing of the dam ( Bureau of Reclamation, Development of Hydraulic Structures, Thomas J. Rhone, 1988. [http://www.usbr.gov/pmts/hydraulics\\_lab/history/Rhone/index.html](http://www.usbr.gov/pmts/hydraulics_lab/history/Rhone/index.html))

**Table 3.18-5. Summary of Solid Waste Generation for Each Action Alternative**

Dam Location	Earth <sup>2</sup> (yd <sup>3</sup> )	Concrete <sup>2</sup> (yd <sup>3</sup> )	Metal (tons)	Wood – Hazmat <sup>1</sup> (tons)	Rebar (tons)
<b>Proposed Action - Full Facilities Removal</b>					
J.C. Boyle	140,000	40,000	3,000	-	2,400
Copco No. 1	-	62,000	1,200	-	900
Copco No. 2	1,500	12,000	2,000	550	600
Iron Gate	1,100,000	12,000	1,000	-	600
<b>Total</b>	<b>1,241,500</b>	<b>126,000</b>	<b>7,200</b>	<b>550</b>	<b>4,500</b>
<b>Partial Facilities Removal of Four Dams</b>					
J.C. Boyle	140,000	20,000	2,000	-	1,200
Copco No. 1	-	57,500	200	-	600
Copco No. 2	0	4,500	500	550	200
Iron Gate	1,100,000	8,000	500	-	400
<b>Total</b>	<b>1,240,000</b>	<b>90,000</b>	<b>3,200</b>	<b>550</b>	<b>2,400</b>
<b>Fish Passage at Four Dams</b>					
J.C. Boyle	-	2,800	-	-	90
Copco No. 1	-	5,800	-	-	190
Copco No. 2	-	1,000	-	-	30
Iron Gate	-	7,000	-	-	230
<b>Total</b>	<b>-</b>	<b>16,600</b>	<b>-</b>	<b>-</b>	<b>540</b>
<b>Fish Passage at Two Dams</b>					
J.C. Boyle	-	2,800	-	-	90
Copco No. 1 (removed)	-	62,000	1,200	-	900
Copco No. 2	-	1,000	-	-	30
Iron Gate (removed)	1,100,000	12,000	1,000	-	600
<b>Total</b>	<b>1,100,000</b>	<b>77,800</b>	<b>2,200</b>	<b>-</b>	<b>1,620</b>

Source: Reclamation 2011

Notes:

<sup>1</sup> Wood power poles not included. See Section 3.21, Toxic/Hazardous Materials for further information regarding wood waste.

<sup>2</sup> In-place volumes shown. Increase volumes by 20 percent for earth and 30 percent for concrete for transportation purposes.

Key:

yd<sup>3</sup>: cubic yards

*The Proposed Action would remove existing hydropower facilities, resulting in a loss of hydropower. Under the Proposed Action, four of the seven power generating facilities of the KHP would be removed. PacifiCorp would continue to own its Fall Creek Facility, and its continued operation is not part of the Secretarial Determination. Also, as noted above, PacifiCorp proposed to decommission its East Side and West Side facilities as part of relicensing (FERC 2007). The installed capacity of the*

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Four Facilities that would be removed is approximately 169 MW and FERC rates the project's dependable capacity as 42.7 MW<sup>2</sup> (CEC 2006). The Four Facilities have a total average annual electric output of 716,800 MWh (FERC 2007).

Dam decommissioning would require replacement power to serve the customers in the project area. According to the Western Electricity Coordinating Council's (WECC) 2009 Power Supply Assessment, the Northwest region has a large surplus power supply resulting from increased generating resources and a demand reduced due to the economic downturn; however, this surplus may be overstated based on the way the power supply model solves supply deficits (WECC 2009).

In addition to the surplus, the power is generated in the Northwest with hydroelectric facilities, which are able to provide peaking power, but not sustained heavy load production (WECC 2009). Nevertheless, all energy forecasts show the Northwest region having an energy surplus at the beginning of the 2010 forecast period that, while in decline over the study period (2010 – 2018), are sufficient to meet the needs of the sub region through 2018 (WECC 2009). The surplus capacity may not be able to be sustained over a prolonged cold spell or heat wave, due to the nature of hydro generation.

Removal of the Four Facilities would result in the loss of 169 MW, or 658,000 MWh from the Northwest Power Pool. This accounts for approximately 1.8 percent of PacifiCorp's power portfolio. While the loss of the power generated may have some impact to the local area, the effects of the loss to the Northwest Power Pool, in light of the scale of the additional generation needed to meet demand over the next 10 years, is minimal.

With the generation capacity of most of the KHP gone, PacifiCorp would be required to buy replacement power on the open power market (PacifiCorp 2004). Given the loss of the KHP, PacifiCorp would need to purchase at least 42.7 MW from other sources to meet their obligations (PacifiCorp 2004).

PacifiCorp's Integrated Resource Plan for 2008 discusses a number of different technologies for meeting the power needs in the Northwest Region forecast for 2018: geothermal, wind, natural gas, coal, and cogeneration (PacifiCorp 2010). Each of the replacement power options would involve some uncertainty specific to the power source. Natural gas plants would require a large amount of fuel, and the future costs and availability of gas supplies are uncertain (PacifiCorp 2004). Cogeneration facilities use excess steam from industrial plants, and the technology is a common form of power generation; however, cogeneration would require an industrial partner and the siting of a potential cogeneration plant (PacifiCorp 2004). Coal plants would require longer

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<sup>2</sup> Dependable capacity is the MW output of a generator or group of generators during a period of low water or other operational constraints that coincide with a peak electrical system load -- essentially a worst case generation capacity, where low water coincides with peak demand. The dependable capacity is the number of megawatts that can be produced for at least four to six hours under these conditions. This is generation based on real world operations at a hydropower generating facility, whereas nameplate capacity is the amount of power that the turbines are capable of generating with all other conditions being perfect (CEC 2003).



construction times and cost more than natural gas plants, but would have much lower operational costs (PacifiCorp 2004). The major issue associated with coal fired plants would be the uncertainty of future carbon tax prices, which could increase the overall cost of the power. The climate change and green house gas emission consequences of these replacement power alternatives are addressed in Section 3.10, Greenhouse Gases/Global Climate Change.

In addition to replacement power, the electrical transmission system that delivers power from existing generation plants in the northwest to the Klamath area is in need of investment. PacifiCorp is planning a series of transmission system upgrades and additions (PacifiCorp 2011a). This project, called the Energy Gateway Transmission Expansion, is intended to upgrade the western electrical transmission system, which has not received a major upgrade in nearly 20 years (PacifiCorp 2011a). Transmission constraints remain an impediment to delivering replacement power to the KHP area. PacifiCorp is currently planning a new transmission line that will connect eastern Idaho to Southern Oregon at the Captain Jack substation outside of Klamath Falls, Oregon (PacifiCorp 2011b). The line would help to balance and transfer the power generated in PacifiCorp's East Side region with the demand in the West (PacifiCorp 2011b).

In addition to the replacement power options and the planned transmission upgrades, PacifiCorp acquired the 520 MW Chehalis gas plant (PacifiCorp 2010).

Under the Klamath Hydroelectric Settlement Agreement, the United States Department of Interior would acquire power from the Bonneville Power Administration (Klamath Basin Signatories 2010). The power would be delivered to the Captain Jack or Malin substations, and transferred by PacifiCorp to customers throughout the company's service area (Figure 3.18- 4, PacifiCorp Service Area). In summary, even without implementation of the Proposed Action, there would be a need to build more generating capacity generally across the Northwest over the next 10 years; PacifiCorp's plans to upgrade transmission capacity; and the KHP's capacity is relatively small in relation to the overall demand and generation capacity in the Northwest region. **The loss of electrical generating capacity/ hydropower from the Proposed Action would be a less than significant impact<sup>3</sup>.**

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<sup>3</sup> This lost hydropower analysis significance determination relies on facility production rates provided in the 2007 FERC FEIS. As noted these production rates currently account for approximately 2% of PacifiCorp's total production portfolio (CEC 2006). Potential upgrades that would improve the efficiency and maximum capacity of the hydroelectric project have been estimated to provide 22% improvements in power production efficiency (Auslam et al 2011). While a number of factors influence power production, if this 22% increase in power production efficiency were directly applied to the project's annual average electric output of 716,800 megawatts hours, the Klamath Hydroelectric Project output would increase to approximately 860,160 megawatts hours which would account for approximately 2.5% of PacifiCorp's total production portfolio, assuming no other changes in the portfolio. As noted in this section PacifiCorp has system wide efficiency and power production upgrades planned to meet forecasted power shortages in 2018. These upgrades are assumed to replace the power production lost from dam removal even with the potential efficiency upgrades and the determination that this impact would be less than significant would not change.

*The loss of the reservoirs could increase available mosquito habitat and increase the risk of disease transmission.* During scoping, members of the public raised a concern that the loss of the lakes would result in an increase in swampy lands and standing water in the footprint of the current reservoirs. The additional standing water could provide mosquito breeding habitat, increasing mosquito population numbers and the chances of disease transmission through insect bites. However, the removal of the reservoirs will reduce the amount of standing water in the vicinity of the existing lakes by returning the river to its free flowing condition. The removal of the reservoirs, the increase in flow to the Klamath River, and the restoration of the river channel will result in less standing water than currently exists in the long term. **The removal of the reservoirs would increase the amount of mosquito breeding areas in the short-term, and would have a less than significant impact on disease transmission.**

#### **Keno Transfer**

*Under the Proposed Action, the Keno Facility will be transferred to the DOI, which could cause adverse effects to Public Health and Safety.* The Keno Transfer is a transfer of title for the Keno Facility from PacifiCorp to the DOI. This transfer would not result in the generation of new impacts on Public Health and Safety, Utilities and Public Services, Solid Waste, or Hydropower compared with existing facility operations. Following transfer of title, DOI would operate Keno in compliance with applicable law and would provide water levels upstream of Keno Dam for diversion and canal maintenance consistent with agreements and historic practice (KHSa Section 7.5.4). **Therefore, the Keno Transfer would result in no change from existing conditions and would have no adverse effects on public health and safety and public utilities.**

#### **East and West Side Facilities**

*Under the Proposed Action, the East and West Side Facilities will be decommissioned, resulting in the loss of generated power.* Decommissioning of the East and West Side canals and hydropower facilities of the Link River Dam by PacifiCorp as a part of the KHSa will redirect water flows currently diverted at Link River Dam into the two canals, back in to Link River. Following decommissioning of the facilities there will be no change in outflow from Upper Klamath Lake or inflow into Lake Ewauna. As shown in Table 3.18-4, the total combined power generating capacity of the facilities is approximately 3.8 MW. The loss of these facilities would not impact PacifiCorp's ability to provide power to the region. The complete decommissioning of the facilities, according the terms of the appropriate public health and safety plan would have no impact to Public Health and Safety. **The impact to public health and safety and public utilities from the decommissioning of the East and West Side Facilities would be less than significant.**

#### **KBRA**

The KBRA includes several programs that could affect utilities and public services, solid waste, and power, including:

- Phases I and II Fisheries Restoration Plans
- Fisheries Reintroduction and Management Plan

- Wood River Wetland Restoration
- On-Project Plan
- Water Use Retirement Program
- Power for Water Management Program
- Emergency Response Plan
- Fish Entrainment Reduction

*Prescribed burning and mechanical thinning under the Phases I and II Fisheries Restoration Plans could affect public services and utilities.* Prescribed burning and mechanical thinning in forests are KBRA actions associated with the Fisheries Restoration intended to mimic natural fire regimes. The efforts reduce the potential for catastrophic fires and subsequent erosion by reducing the available fuel sources for wild fire.

Prescribed burning can affect public services by using public resources to monitor and manage burning which can leave other areas more vulnerable during the prescribed burn. Mechanical thinning has limited effects on utilities and public services. There is some potential for damage to utility lines from falling trees and branches, but these are minimal and addressed through project level plans and environmental analysis. Adverse effects are short term and less than significant and addressed through proper project planning.

Burning and thinning also have long term beneficial effect to public services. These fuel reduction treatments help to slow wildfires, provide defensible areas, and increase the natural resistance to wildfire by removing excess fuels that can help increase the chance that a wildfire will have catastrophic impacts. The long term benefits of fuel reduction in terms of fire prevention outweigh the adverse effects of the actions. The timing of and specific locations where these burning and thinning actions could be undertaken is not certain but it is assumed that some of these actions could occur at the same time and in the vicinity of the hydroelectric facility removal actions analyzed above. The short term effect burning and thinning actions could contribute to the significant impact to public services and utilities of construction activities associated with hydroelectric facility removal. As described above the effect of facility removal on fire risk could be reduced to a less than significant level with mitigation reducing the severity of any interaction with burning and thinning actions. **The effects of prescribed burning and mechanical thinning could be potentially significant in the short term, but implementation of Mitigation Measure PHS-2 would reduce this impact to a less than significant level. The long term effects of fuel reduction are beneficial. Implementation of Prescribed Burning and Mechanical Thinning under the Phases I and II Fisheries Restoration Plans will require future environmental compliance as appropriate.**

*Construction activities associated with the KBRA programs could result in public health and safety impacts.* Potential construction activities could include a variety of restoration actions and habitat improvements. The Fisheries Reintroduction and Management Plan, the Wood River Wetland Restoration, and elements of the On-Project Plan contain construction components that could have distinct health and safety issues related to the

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construction activities. Prior to implementing construction, an applicable public health and safety plan would be developed to ensure construction workers and the public would not be adversely affected during construction and operation. **Impacts from the restoration and habitat improvement action in the KBRA on public health and safety and public utilities are expected to be long term and beneficial. Some short term impacts related to construction activities could occur during the implementation of the restoration and habitat improvement projects. Implementation of these restoration and habitat improvement actions will require future environmental compliance as appropriate.**

*Implementation of the Power for Water Management Program could create new renewable energy sources.* Implementation of the Power for Water Management Program (KBRA Section 17) would provide affordable electricity to eligible users to allow efficient use, distribution, and management of water. This could also involve the development of renewable energy sources, which would provide green energy. This would be a beneficial effect on public utilities. Implementation of the Power for Water Management Program will require future environmental compliance as appropriate. **The Power for Water Management Program would have long term, beneficial effects to public utilities.**

*Completing the Emergency Response Plan could have beneficial effects on Public Services and Public Safety.* The Emergency Response Plan is intended to prepare water managers and emergency responders for potential failure of Reclamation's Klamath Project dikes or other facilities that affect the storage and delivery of water to Reclamation's Klamath Project irrigators. The plan will include a process to prepare for potential emergencies, identify available funding sources for responding to emergencies, a prioritization method for funding emergency responses, and a process to implement emergency responses. The response plan will create new protocols for emergency responders in the area, but new funding sources would offset the costs of training and planning required to prepare effectively for the emergencies covered in the plan.

The Emergency Response Plan could rely on alternative sources of water to meet the irrigation requirements of Reclamation's Klamath Project irrigators. This could reduce local water supplies and effect public utilities in the event of an emergency. These effects would be short term, until the emergency was addressed and supplies rebounded after the use of emergency supplies was finished. **The effects of the Emergency Response Plan on public health and safety would be beneficial as the Plan is intended to address impacts from a failure of the levies and other infrastructure that could adversely affect health and safety. Any impacts to utilities and public services from creating the plan would be beneficial by improving the capacity of local agencies to respond to emergencies.**

#### **Alternative 3: Partial Facilities Removal of Four Dams**

Under the Partial Facilities Removal of Four Dams Alternative, certain project features would be retained, while meeting the requirements for a free-flowing river and for volitional fish passage through all four dam sites. There would be no appreciable

difference between the impacts of the Partial Facilities Removal of Four Dams and the Proposed Action Alternatives, except as noted below. As it would be for the Proposed Action, implementation of Mitigation Measures PHS-1 and PHS-2 would mitigate the impacts of the Partial Facilities Removal of Four Dams Alternative to a less-than-significant level.

*Retained structures could have the potential to result in public health and safety risks.* The presence of powerhouses, tunnels, penstocks and other equipment would have the potential to cause injuries resulting from entrapment and falls. Implementation of this alternative would include installing appropriate fencing and blocking access to retained facilities. **These safety hazards would be a less than significant impact given that fencing and access restrictions are part of the construction activities associated with the project.**

*Construction activities could generate a substantial amount of solid waste that would exceed the capacity of facilities to receive the waste.* Under the Partial Facilities Removal of Four Dams Alternative, certain project features would be retained, while meeting the requirements for a free-flowing river and for volitional fish passage through all four dam sites. As with the Proposed Action, construction and demolition activities would produce solid waste. As shown in Table 3.18-5, the total amount of inert solid waste that would be generated under the Partial Facilities Removal of Four Dams would be 1,240,000 yd<sup>3</sup> of earth, 90,000 yd<sup>3</sup> of concrete, 2,400 tons of rebar, and 3,200 tons of metals. As with the Proposed Action, all the waste concrete and earth would be disposed in on-site disposal areas or in the original borrow pits, and a portion of the metals would be recycled, in accordance to relevant construction debris recycling regulations, at the Yreka Transfer Station, the Yreka Sanitation Landfill, and the Klamath Falls Landfill. In addition, Dry Creek Landfill, also in the vicinity of the project area, has 165 million yd<sup>3</sup> of disposal capacity, and could be utilized for disposal. The disposal capacities of the existing surrounding landfills are anticipated to be sufficient for the waste generated by activities associated with the Partial Facilities Removal of Four Dams Alternative, and the waste generated would not conflict with the solid waste policies and objectives of AB939. **The solid waste impacts associated with the Partial Facilities Removal of Four Dams Alternative would be less than significant.**

#### **KBRA**

The KBRA would be fully implemented under this alternative. The public health and safety, public services, and hydropower impacts of the KBRA under the Partial Facilities Removal of Four Dams Alternative would be the same as for the Proposed Action.

#### **Alternative 4: Fish Passage at Four Dams**

Under the Fish Passage at Four Dams Alternative, no facilities removal would be conducted at the Four Facilities. Fish passageways will be built at each of the Four Facilities in the form of pool & weir, vertical slot, ice harbor, or hybrid fish ladder with auxiliary water systems. The impacts associated with the Fish Passage at Four Dams

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Alternative would be similar to those of the Proposed Action, except as noted below. As it would be for the Proposed Action, implementation of Mitigation Measures PHS-1 and PHS-2 would mitigate the impacts of the Partial Facilities Removal of Four Dams Alternative to a less-than-significant level.

*Construction activities could generate solid waste that would exceed the capacity of facilities to receive the waste.* Under this alternative, construction of fish passageways would generate solid waste. As shown in Table 3.18-5, the total amount of inert construction solid waste generated under the Fish Passage at Four Dams Alternative would be 16,600 yd<sup>3</sup> of concrete and 540 tons of rebar from demolition and replacement of the existing fish ladder at J.C. Boyle Dam. As with the Proposed Action, all of the waste concrete is expected to be disposed of in on-site disposal areas or in the original borrow pits and a portion of the metals would be recycled, in accordance to relevant construction debris recycling regulations, at the Yreka Transfer Station, the Yreka Sanitation Landfill, and the Klamath Falls Landfill. In addition, Dry Creek Landfill, also in the vicinity of the project area, has 165 million yd<sup>3</sup> of disposal capacity, and could be utilized for disposal. The disposal capacities of the existing surrounding landfills are anticipated to be sufficient for the waste generated by activities associated with the Fish Passage at Four Dams Alternative, and the waste generated would not conflict with the solid waste policies and objectives of AB939. **The solid waste impacts associated with the Fish Passage at Four Dams Alternative would be less than significant.**

*Impacts on Hydropower resulting from the Fish Passage at Four Dams Alternative would reduce power generation compared to the No Action/No Project Alternative.* Providing fish passage at the Four Facilities would allow the hydroelectric facilities to remain in place, but hydropower generation would be subject to significant reduction from additional bypass flows, changes to flows in the peaking reaches, and flows required for fish passage structures as compared with the No Action/No Project Alternative. These additional flow releases would be needed to support fish migration in the J.C. Boyle and Copco 2 bypass reaches and peaking reaches. All dams would require flows to support fish bypass structures.

Although the hydropower loss would vary from 100 percent to 73 percent in the peak demand summer months with additional bypass and fish flows (PacifiCorp 2006), the loss of this power would not require the construction of additional electrical generating facilities or infrastructure, as described under the discussion of Proposed Action effects. **The loss of power would be less than significant.**

#### **Alternative 5: Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate**

Under the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative, facilities would be removed at Copco 1 and Iron Gate Dams, and fish passage facilities would be constructed at J.C. Boyle and Copco 2 Dams. Because only Copco 1 and Iron Gate Dams (and not J.C. Boyle or Copco 2 Dams) would be removed under this alternative, there would be less demolition than under the Proposed Action. As it would be for the Proposed Action, implementation of Mitigation Measures PHS-1 and

PHS-2 would mitigate the impacts of the Partial Facilities Removal of Four Dams Alternative to a less-than-significant level. The impacts of the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would be similar to those of the Proposed Action, except as noted below.

*Construction activities could generate solid waste that would exceed capacity of facilities that receive the waste.* Under the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative, facilities would be removed at Copco 1 and Iron Gate Dams. Fish passage facilities would be constructed at J.C. Boyle and Copco 2 Dams. As with the other action alternatives, construction and demolition activities would produce solid waste.

As shown in Table 3.18-5, the total amount of inert construction and demolition solid waste generated under the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would be 1,100,000 yd<sup>3</sup> of earth, 77,800 yd<sup>3</sup> of concrete, 2,200 tons of metals, and 1,620 tons of rebar. As with the Proposed Action, all of the waste concrete and earth would be disposed of in on-site disposal areas or in the original borrow pits and a portion of the metals would be recycled, in accordance to relevant construction debris recycling regulations, at the Yreka Transfer Station, the Yreka Sanitation Landfill, and the Klamath Falls Landfill. Given that the combined remaining permitted Class III landfill capacity available at the Klamath Falls Landfill and the Yreka Solid Waste Landfill is 4.3 yd<sup>3</sup>, the regional landfills in the surrounding counties should be capable of handling the additional waste generated by the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative. In addition, Dry Creek Landfill, also in the vicinity of the project area, has 165 million yd<sup>3</sup> of disposal capacity, and could be utilized for disposal. The disposal capacities of the existing surrounding landfills are anticipated to be sufficient for the waste generated by activities associated with the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative, and the waste generated would not conflict with the solid waste policies and objectives of AB939. **The solid waste impacts associated with the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would be less than significant.**

*Impacts on Hydropower resulting from the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would reduce power generation compared to the No Action/No Project alternative.* Under this alternative, Iron Gate and Copco 1 Dams would be removed, leaving Copco 2 and J.C. Boyle Dams. The total authorized power production that would be lost under this alternative would be 38 MW, or 0.4 percent of PacifiCorp's total generating capacity. Additionally, operations of the remaining dams would require bypass flows and fish passage structure flows further decreasing hydropower production, as noted for the Fish Passage at J.C Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative. This alternative would result in a small amount of power lost compared with PacifiCorp current generating capacity and planned generating and transmission capacity upgrades. As discussed for the Proposed Action, PacifiCorp will acquire surplus power from other existing facilities to serve the project

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area and no additional facilities or infrastructure would be necessary. **The reduced power impacts would be less than significant.**

#### **3.18.4.4 Mitigation Measures**

##### **Mitigation Measure by Consequences Summary**

*Mitigation Measure PHS-1:* A public safety management plan will be prepared and implemented to maintain public safety during all phases of construction and demolition. Components of the plan will include the following:

- Public notification of the location and duration of construction and demolition activities, pedestrian/bicycle path/trail closures, and restrictions on reservoir use (i.e., boating, water skiing, fishing, swimming).
- Verification with local jurisdictions that construction blockage of existing roadways will not interfere with existing emergency evacuation plans.
- Verification with local jurisdictions that construction use of existing roadways for truck hauling of materials will not substantially interfere with response times of emergency vehicles.
- Adequate signage will be installed regarding the location of construction and demolition sites and warning of the presence of construction equipment.
- Fencing of construction staging areas and of construction and demolition areas if dangerous conditions exist when construction and demolition are not occurring.
- Temporary walkways (with appropriate markings, barriers, and signs to safely separate pedestrians from vehicular traffic) and detour signage where an existing sidewalk or pedestrian/bicycle path/trail will be closed during construction and demolition.

*Mitigation Measure PHS-2:* Prior to initiating construction and demolition activities, the Dam Removal Entity, in consultation with the appropriate city, county, and state fire suppression agencies will prepare and implement a Fire Management Plan. The plan will include fire prevention and response methods including fire precaution, pre-suppression, and suppression measures consistent with the policies and standards in the affected jurisdictions. Additionally, fire suppression equipment will be required on-site at all times and emergency contact numbers will be posted in case of a fire. This plan will include provisions that areas of construction and deconstruction work involving welding, grinding, torch-cutting, gas and diesel generators and other construction activities that could result in open sparks or flame be cleared of dried vegetation or wetted-down to prevent wildfires.

##### **Effectiveness of Mitigation in Reducing Consequence**

Implementation of PHS-1 and PHS-2 would reduce potential public health and safety risks to a less than significant level.

##### **Agency Responsible for Mitigation Implementation**

The DRE would be responsible for implementing mitigation measures PHS-1 and PHS-2.

##### **Remaining Significant Impacts**

Following implementation of Mitigation Measures PHS-1 and PHS-2, no significant adverse impacts associated with public health and safety, utilities and public services, solid waste, and power are anticipated.

#### **Mitigation Measures Associated with Other Resource Areas**

Several other mitigation measures require construction, including mitigation measures H-2 (flood-proof structures), GW-1 (deepen or replace affected wells), WRWS-1 (modify or screen affected water intakes), REC-1 (develop new recreational facilities and access to river), TR-6 (assess and improve roads to carry construction loads), and TR-7 (assess and improve bridges to carry construction loads). Construction required for the mitigation measures would not require substantial equipment or materials and would not pose risks to public health or safety. **Construction associated with these mitigation measures would have temporary and less-than-significant effects on public health and safety, solid waste, and public utilities and services. There would be no change from existing conditions for power.**

*Mitigation REC-1 would develop recreational facilities and access points along the newly formed river channel between J.C. Boyle Reservoir and Iron Gate Dam.*

Recreation facilities, such as campgrounds and boat ramps, currently located on the edge of the reservoir would need to be replaced in appropriate areas near the new river channel once the reservoir is removed. Impacts specific to the relocation of the Recreation Facilities are discussed in Section 3.20, Recreation. The facilities would be built to current standards, and maintained by the final title holder of the exposed land. **The replacement of recreational facilities would have a less than significant impact on public health, safety, solid waste, and public utilities and services. There would be no change from existing conditions for power.**

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